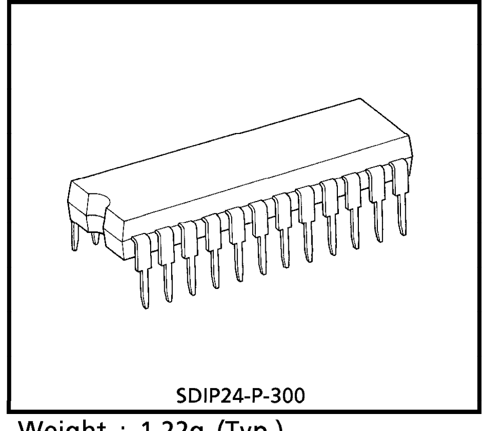
PIF / SIF + ATT IC FOR TV / VTR



Weight : 1.22g (Typ.)

FEATURES

PIF section

- RF-Pre Amp. less by high input sensitivity
- 3-Stage IF amplifier with variable gain
- High-Speed response AGC with dual time constants
- Single end AFT output with defeat function
- Delayed RF AGC output (Reverse AGC)
- Output with white / black noise inverter
- Output without white / black noise inverter
- Video mute switch

SIF section

- 3-stage limiter amplifier
- Quadrature-type detection circuit
- Use of a ceramic discriminator device makes the SIF circuit adjustment-free
- Sound mute switch
- N.F. audio amplifier
- DC ATT control

BLOCK DIAGRAM

IF AGC Filter-2
IF AGC Filter-1
RF AGC Delay
FROM Tuner
SAW
PIF GND
RF AGC Output
Sound Output (De-Emphasis)
SIF Coil
Audio Input
NF
AFT Output
PIF V_{CC}
V_{CC}
AFT Coil
Defeat SW
Video Coil
Video Output-2 (Output with noise inverter)
Video Output-1 (Output without noise inverter)
SIF V_{CC}
SIF Input
SIF GND
ATT
Audio Output
AFT Det.
Video Det.
Pre Amp.
DC Amp.
Limit Amp.
Noise Inverter
IF AGC
3rd IF
AGC Det.
2nd IF
RF AGC
1st IF
PIF V_{CC}
39kΩ
1st Limit
2nd Limit
3rd Limit
FM Det.
Amp.
ATT

TERMINAL FUNCTION

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
1 2	AGC Filter	This filter is a dual time constant system to speed up AGC. By connecting the primary filter terminal of pin 2 to GND, the picture muting is executed.	V_{CC}, 51Ω, 20kΩ, IF Amp., 2kΩ, AGC Det., 500Ω, 3kΩ
3	AGC Delay	This terminal adjusts the delay point of RF AGC by varying the reference voltage of comparator.	V_{CC}, 9.5kΩ, 10kΩ, 18.5kΩ, AGC, RF AGC Output
4 5	PIF Input	This is an input terminal of PIF signal using an emitter follower. The input impedance is typical 2.5kΩ, 4pF.	V_{CC}, 2.5kΩ, 2.5kΩ, 4kΩ, 4kΩ, 6kΩ
6	PIF GND	GND pin for the PIF amplifier. Connect a capacitor between pins 23 and 6.	—
7	RF AGC Output	Output pin for RF-AGC supplied to the tuner. (A 39kΩ resistor is connected internally between pin 7 and the internal power supply pin.)	V_{CC}, 39kΩ, 10kΩ, AGC Delay

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
8	FM Det Output (De-emphasis)	This is an output terminal of FM detector circuit. (Supply this signal to the de-emphasis circuit.)	100Ω, 8
9 10	SIF Coil	This terminal connects FM detector Coil. Use of a ceramic discriminator device makes the SIF circuit adjustment-free. By connecting pin 9 to GND, the Audio muting is executed.	12kΩ, 12kΩ, 9, Audio Mute, FM Det., 11kΩ, 11kΩ, 200Ω, 10, FM Det.
11	Audio Input	Sound amplifier Input terminal.	5kΩ, 5kΩ, 8kΩ, 11
12	NF	Sound amplifier negative feedback terminal.	3kΩ, 100Ω, 3kΩ, 12, 1.5kΩ, 1.5kΩ, Sound Amp.
13	Audio Output	Sound Signal Output terminal.	100Ω, 13

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
14	ATT	Sound amplifier gain control terminal.	
15	SIF GND	GND pin for the SIF amplifier. Connect a capacitor between pins 15 and 17.	—
16	SIF Input	Limiter amplifier input terminal.	
17	SIF V_{CC}	V_{CC} pin for the SIF amplifier. Connect a capacitor between pins 15 and 17.	—
18	Video Signal Output-1 (N.I. OFF)	This is an output terminal of video output. By connecting Pin 2 to GND, a muting is executed. Output Signal supplied to the sound IF (SIF) circuit. (Example for diversity antenna circuit.)	
19	Video Signal Output-2 (N.I. ON)	This is an output terminal of video output. By connecting Pin 2 to GND, a muting is executed.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
20 21	Video Coil	This terminal connects video detector Coil.	V_{CC}, 3kΩ, 3kΩ, (20), (21), V_{CC}, AFT, 18kΩ, 18kΩ
22	AFT Coil	Supply a control signal by single end. This method is that the phase difference is treated as current and voltage is converted by an external resistor. There-fore, this can be connected to AFT using only one pin. By connecting a resistor of 5.1kΩ to GND, an AFT defeat can be executed.	V_{CC}, (22), 100Ω, 3.3kΩ, 3.3kΩ
23	PIF V_{CC}	V_{CC} Pin for the PIF amplifier. Connect a capacitor between pins 6 and 23.	—
24	AFT Output	This is an output terminal of AFT.	(24), 1kΩ, 200Ω, 200Ω

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	15	V
Power Dissipation	P_D (Note)	1.4	W
Operating Temperature	T_{opr}	−20~65	°C
Storage Temperature	T_{stg}	−55~150	°C

(Note) When using the device at above Ta = 25°C, decrease the power dissipation by 11.2mW for each increase of 1°C.

RECOMMENDED SUPPLY VOLTAGE

PIN No.	PIN NAME	MIN.	TYP.	MAX.	UNIT
17	PIF V_{CC}	8.1	9.0	9.9	V
23	SIF V_{CC}	8.1	9.0	9.9	V

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS (Unless otherwise specified, V_{CC} = 9V, Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC}	1	—	29	43	56	mA
Terminal Voltage	Pin 3	V_3	1	SW_2 : b	5.7	6.2	6.7	V
	Pin 4	V_4		—	3.5	4.0	4.5	
	Pin 5	V_5		—	3.5	4.0	4.5	
	Pin 7	$V_{7(1)}$		SW_1 : a SW_2 : c	8.8	—	—	
		$V_{7(2)}$		SW_1 : b SW_2 : a	—	—	0.5	
	Pin 8	V_8		SW_3 : b	3.3	3.9	4.5	
	Pin 9	V_9		SW_3 : a	2.2	2.7	3.2	
	Pin 10	V_{10}		—	3.2	3.7	4.2	
	Pin 11	V_{11}		—	3.0	3.5	4.0	
	Pin 12	V_{12}		—	5.7	6.2	6.7	
	Pin 13	V_{13}		SW_4 : b	4.4	4.9	5.4	
	Pin 14	V_{14}		SW_4 : a	2.0	2.5	3.0	
	Pin 16	V_{16}		—	2.5	3.0	3.5	
	Pin 18	V_{18}		—	4.2	4.7	5.2	
	Pin 19	V_{19}		—	4.2	4.7	5.2	
	Pin 20	V_{20}		—	5.8	6.3	6.8	
	Pin 21	V_{21}		—	5.8	6.3	6.8	
	Pin 22	V_{22}		SW_5 : a	2.3	2.8	3.3	
	Pin 24	V_{24}		SW_5 : b	2.5	4.0	5.5	

AC CHARACTERISTICS (Unless otherwise specified, V_{CC} = 9V, Ta = 25°C)
PIF section (When using the specified video coil)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Sensitivity		V_{in} MIN	2	(Note 1)	36	41	46	dBμV
Maximum Input Level		V_{in} MAX	2	(Note 2)	100	110	—	dBμV
IF AGC Range		ΔA	2	—	50	62	—	dB
Differential Gain		DG	3	(Note 3)	—	—	8	%
Differential Phase		DP			—	—	6	°
No-signal Output Level		V_{14}, V_{15}	2	(Note 4)	4.0	4.6	5.2	V
Sync. Tip Level		V_{SYNC}	2	(Note 5)	2.0	2.3	2.6	V
Video Output Amplitude		V_{OUT}	2	(Note 6)	1.7	2.0	2.3	V_{p-p}
White Noise Inverter Level		V_{WTH}	2	(Note 7)	—	5.0	—	V
White Noise Clamp Level		V_{WCL}			—	3.8	—	
Black Noise Inverter Level		V_{BTH}			0.9	1.2	1.5	
Black Noise Clamp Level		V_{BCL}			3.2	3.5	3.8	
Carrier Wave Rejection Ratio		C_L	4	(Note 8)	40	—	—	dB
Harmonic Rejection Ratio		I_{2nd}	4	(Note 9)	40	—	—	dB
AFT Sensitivity		ΔF / ΔV	2	(Note 10)	—	20	30	kHz / V
AFT Output Voltage	Min.	V_L	2	—	—	0.1	0.5	V
	Max.	V_U			8.4	8.7	—	
Intermodulation		I_{920}	4	(Note 11)	30	38	—	dB

SIF section (When using the specified SIF coil)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
FM Detector Output Level	V_{OD}	5	(Note 12)	350	550	750	mV_{rms}
Limiting Sensitivity	V_{INLIM}	5	(Note 13)	—	40	50	dBμV
AM Suppression Ratio	AMR	5	(Note 14)	40	—	—	dB
−3dB Bandwidth	$\pm \Delta f_G$	5	(Note 15)	60	80	—	kHz
Distortion Bandwidth (1.5%)	$\pm \Delta f_D$	5	(Note 16)	50	70	—	kHz
ATT AC Gain	G_V (ATT)	2	(Note 17)	8	10	12	dB
ATT Maximum Attenuation	ATT MAX	2	(Note 18)	75	—	—	dB
Audio Amp. AC Gain	G_V (AF)	2	(Note 19)	15	17	19	dB

TEST CONDITIONS

(Note 1) Input sensitivity

PIF input (Pin 4) : f_o = 58.75MHz, f_m = 15.75kHz, 30% AM, 84dBμV.
Gradually reduce the input level. Measure the input level when the detection output at video output (Pin 19-a) will be −3dB.

(Note 2) Maximum input level

PIF input (Pin 4) : Input same as Note 1.
Gradually raise the input level. Measure the input level when the detection output at video output (Pin 19-a) is at the noise inverter threshold.

(Note 3) Differential gain / Differential phase

PIF input (Pin 4) : f_o = 58.75MHz, Standard television signal (V / S = 10 : 4 ramp waveform), 87.5% AM, 84dBμV.
IF AGC = Free.
Measure the differential gain and differential phase with a vector scope. (Pin 19-b)

(Note 4) No-signal output level

PIF input (Pin 4) : No input. 2nd AGC terminal (Pin 1) : GND, Measure DC voltage at video output (Pin 19-a).

(Note 5) Sync. Tip level

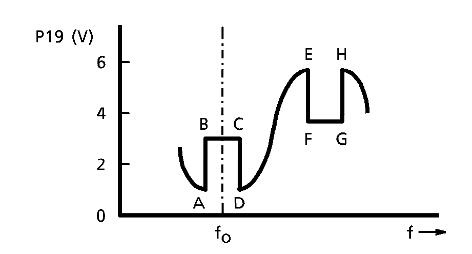
PIF input (Pin 4) : Input same as Note 3. Measure Sync. Tip DC voltage at video output (Pin 19-b).

(Note 6) Video output amplitude

PIF input (Pin 4) : Input same as Note 3. Measure amplitude level at video output (Pin 19-b).

(Note 7) Noise inverter

PIF input (Pin 4) : f_o = 57~65MHz (Sweep Signal), 84dBμV.
Connect monitor scope to video output (Pin 19-b).
Measure the 2nd AGC terminal (Pin 1) voltage and fix the terminal to that voltage using the external power supply.
Then, 2nd AGC Voltage variable when a waveform like that in the accompanying diagram is output.



AP : Black Noise Inverter Level.

BC : Black Noise Clamp Level.

EH : White Noise Inverter Level.

FG : White Noise Clamp Level.

(Note 8) Carrier wave rejection ratio

PIF input (Pin 4) : $f_o = 58.75\text{MHz}$, $f_m = 15.75\text{kHz}$, 78% AM, 84dBμV.
Add the voltage 2nd AGC terminal (Pin 1), So that the video output (Pin 19-b) can be $2V_{p\text{-}p}$.
Calculate the following equation by setting the modulation to 「0」 and measuring the output carrier level.

$$C_L = 20\ell og \frac{2.0}{V_{MOD}「0」(V_{p\text{-}p})} \text{ [dB]}$$

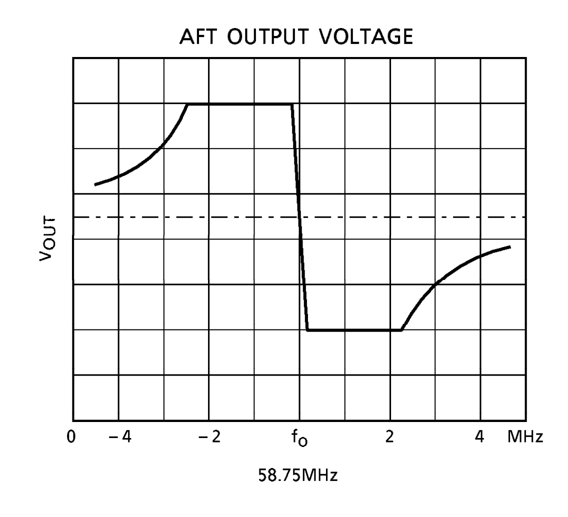
(Note 9) Harmonic rejection ratio

Measure as is Note 8, above, and calculate the secondary harmonic level (117.5MHz component) at video output (Pin 19-b).

(Note 10) AFT sensitivity

PIF input (Pin 4) : $f_o = 58.75\text{MHz}$, 84dBμV, CW.
Input the above signal and adjust the AFT coil so that the AFT output pin (Pin 24) voltage is 4.5V.
Measure the output voltage differential (ΔV) of the AFT output pin when the frequency is raised by 20kHz. Then, calculate the ratio using the following formula.

$$\frac{\Delta f}{\Delta V} = \frac{20}{\Delta V} \text{ [kHz / V]}$$



(Note 11) Intermodulation

PIF input (Pin 4) : Input the following composite signals to the PIF input.

(1) SG1 : 58.75MHz (P) 84dBμV
(2) SG2 : 54.25MHz (S) 74dBμV
(3) SG3 : 55.17MHz (C) 74dBμV

Monitor the video output (Pin 19-b) detection output waveform. Apply external voltage to the 2nd AGC terminal (Pin 1) So that the waveform's lowest level matches the sync. Tip level.
Using a spectrum analyzer, measure the difference between the level of the chroma signal component and 920kHz signal component.

(Note 12) FM detection output

SIF input (Pin 16) : f_o = 4.5MHz, f_m = 400Hz, 25kHz / devi, 100dBμV.
Measure the sound detection output of the sound output terminal (Pin 8).

(Note 13) Limiting sensitivity

SIF input (Pin 16) : Input same as Note 12. Gradually reduce the input signal. Measure the input level when the sound detection output of the sound output terminal (Pin 8) will be −3dB.

(Note 14) AM Suppression ratio

SIF input (Pin 16) : f_o = 4.5MHz, 84dBμV.
Measure the sound detection output level of the sound output terminal (Pin 8) when the above signals are modulated as follows. Calculate The ratio.

(1) AM modulation : f_m = 400Hz, 30%
(2) FM modulation : f_m = 400Hz, 25kHz / devi

$$AMR = 20\ell og\left(\frac{\text{with FM modulation } (mV_{rms})}{\text{with AM modulation } (mV_{rms})}\right) [dB]$$

(Note 15) −3dB bandwidth

SIF input (Pin 16) : f_o = 4.5MHz, f_m = 400Hz, 7.5kHz / devi, 100dBμV.

(1) f_{AFh} : Gradually raise the frequency. Measure the input frequency when the sound detection output of the sound output terminal will be −3dB.
(2) f_{AFl} : Gradually lower the frequency. Measure the input frequency when the sound detection output of the sound output terminal will be −3dB.

$$-3dB \text{ bandwidth} = (f_{AFh} - f_{AFl}) \text{ [kHz]}$$

(Note 16) Distortion bandwidth (1.5%)

SIF input (Pin 16) : Input same as Note 15.

(1) f_{DAFh} : Gradually raise the frequency. Measure the Input frequency when the sound distortion ratio of the sound output terminal will be 1.5%.

(2) f_{DAFl} : Gradually lower the frequency. Measure the input frequency when the sound distortion ratio of the sound output terminal will be 1.5%.

Distortion bandwidth = ($f_{DAFh} - f_{DAFl}$) [kHz]

(Note 17) ATT AC gain

Audio input (Pin 11) : f = 1kHz, $0.1V_{p-p}$.
Measure the negative feedback terminal (Pin 12) output level.
Calculate the ratio using the following formula.

$$G_V\ (ATT) = 20\ell og \frac{(Pin\ 12)\ V_{p-p}}{(0.1)\ V_{p-p}}\ [dB]$$

(Note 18) ATT maximum attenuation

Audio input (Pin 11) : f = 1kHz, $0.5V_{p-p}$.
ATT terminal volume is Max and Min. (Audio Control : Pin 14)
Measure the negative feedback terminal (Pin 12) output level.
Calculate the ratio using the following formula.

$$ATT\ MAX = 20\ell og \frac{(Volume\ Max)\ V_{p-p}}{(Volume\ Min)\ V_{p-p}}\ [dB]$$

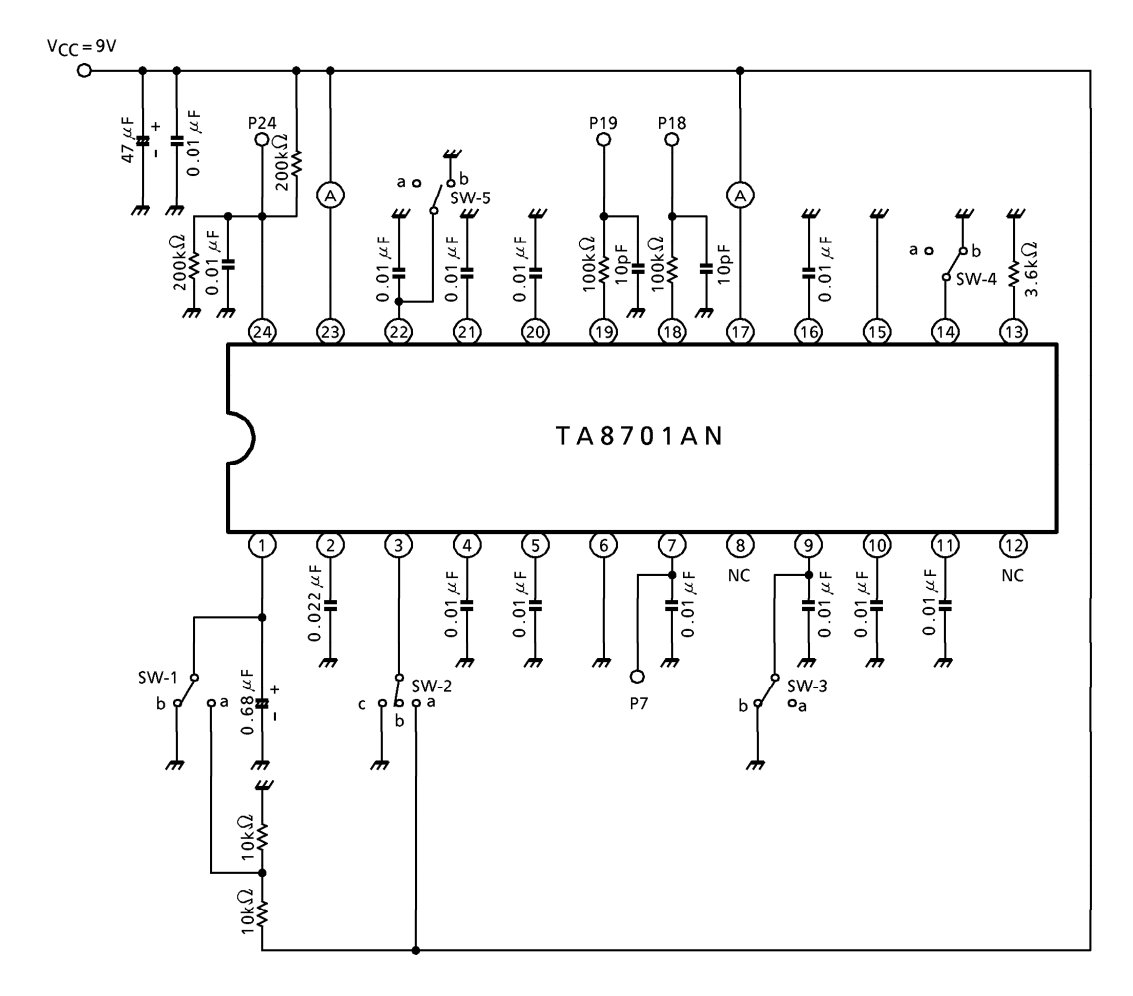
(Note 19) Audio amp. AC gain

Audio input (Pin 11) : f = 1kHz, $0.1V_{p-p}$.
ATT terminal volume is Max. (Audio Control : Pin 14)
Measure the Audio output terminal (Pin 13) output level.
Calculate the ratio using the following formula.

$$G_V\ (AF) = 20\ell og \frac{(Pin\ 13)\ V_{p-p}}{(0.1)\ V_{p-p}}\ [dB]$$

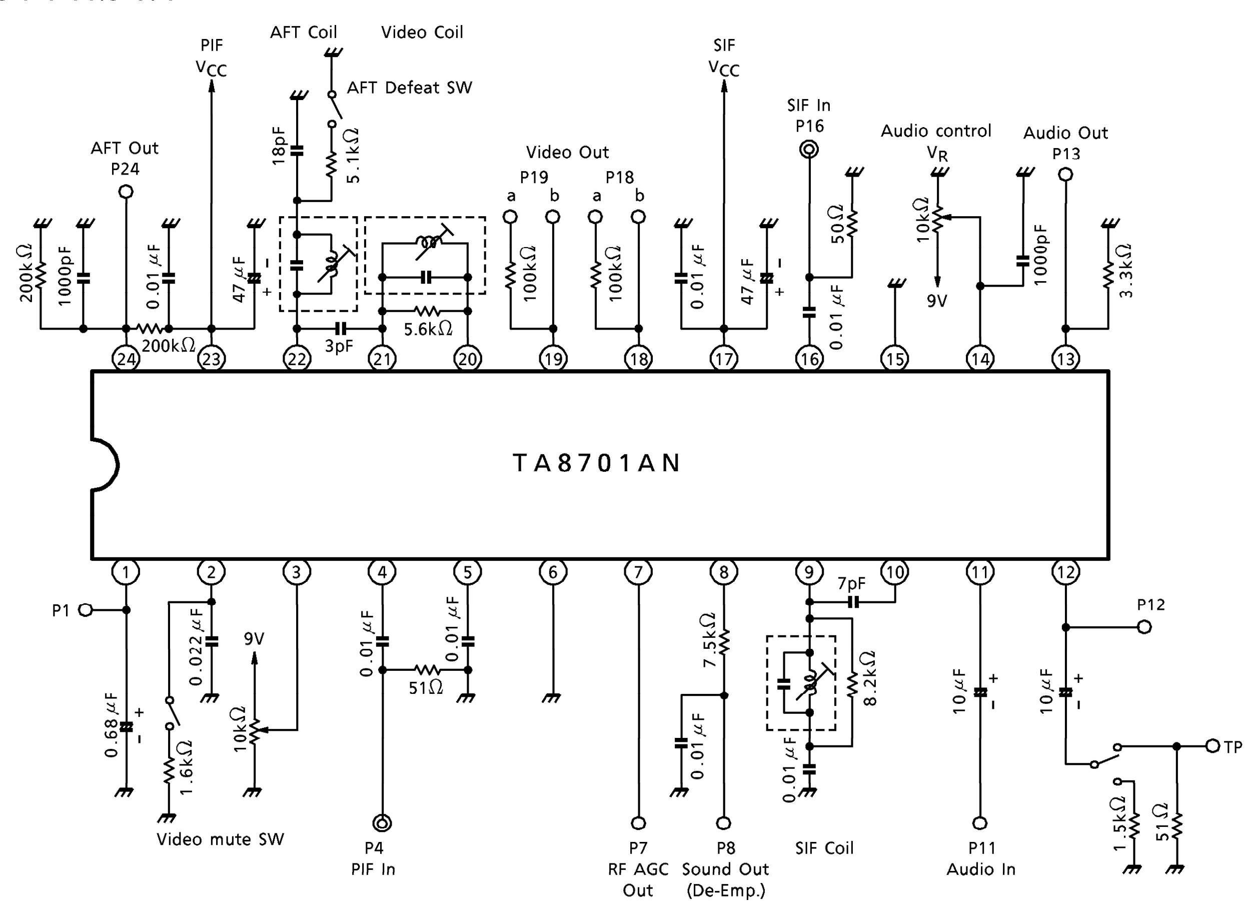
TEST CIRCUIT 1

DC characteristic



TEST CIRCUIT 2

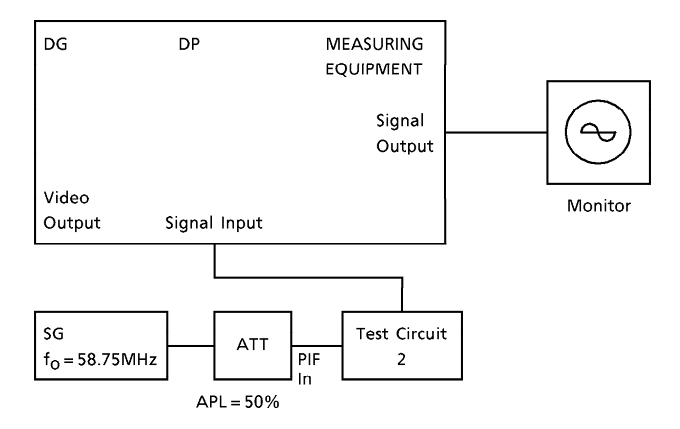
AC characteristic



COIL	JAPAN	USA
VIDEO	TRF1060D	TRF1066
AFT	TRF1059D	TRF1066
SIF	TRF6010D	TRF6010D

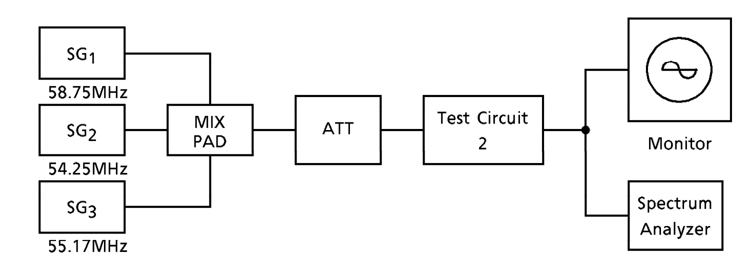
TEST CIRCUIT 3

DG / DP



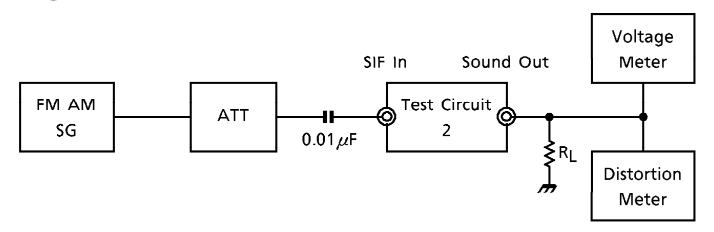
TEST CIRCUIT 4

Carrier wave rejection ratio, harmonic rejection ratio and intermodulation

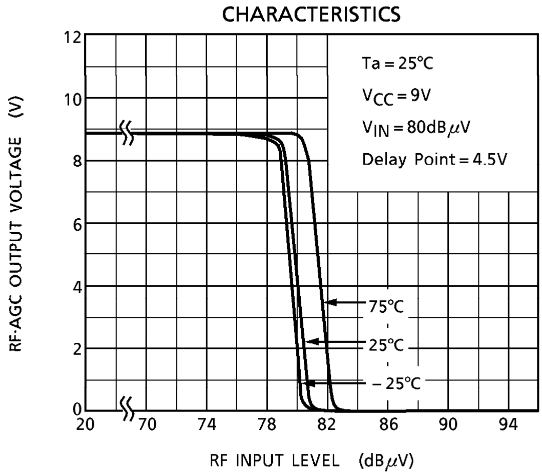


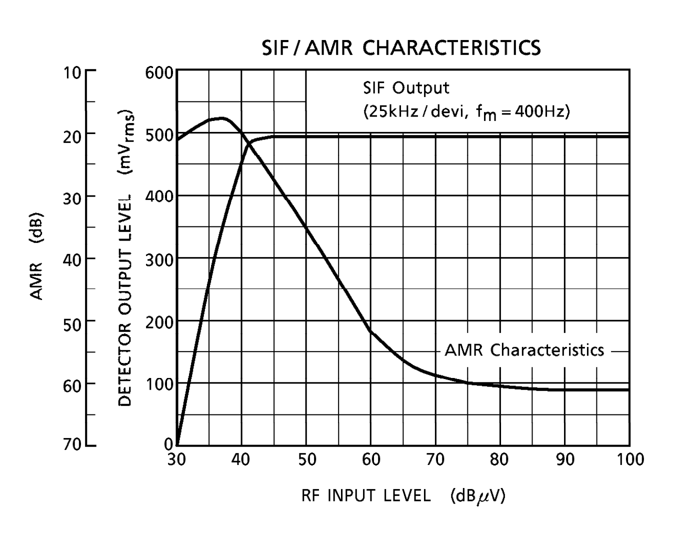
TEST CIRCUIT 5

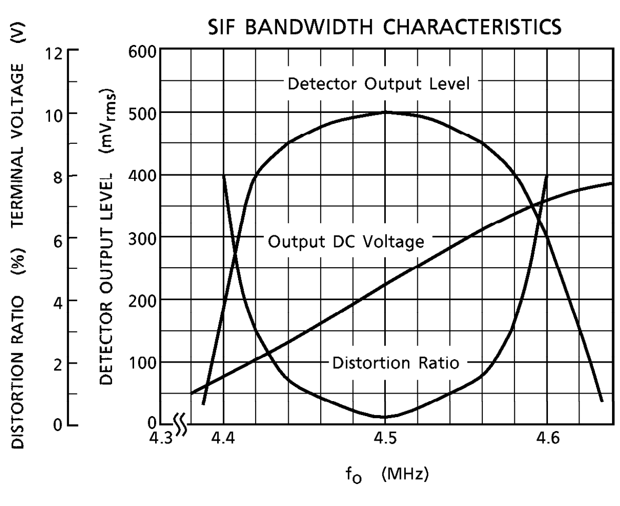
$V_{IN\ (LIM)}$, AMR, V_{OD}, Δf_G, Δf_D

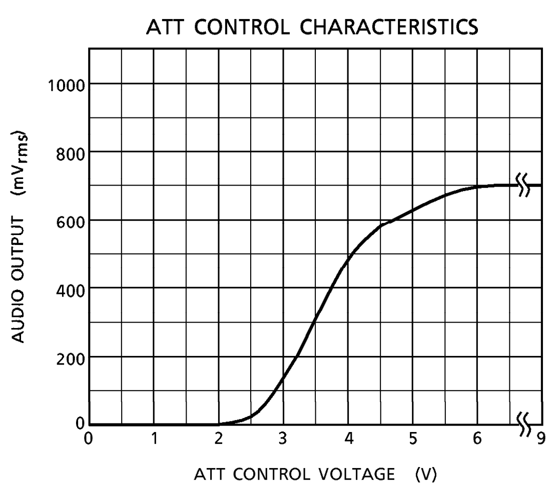



RF·AGC DELAY POINT TEMPERATURE
CHARACTERISTICS

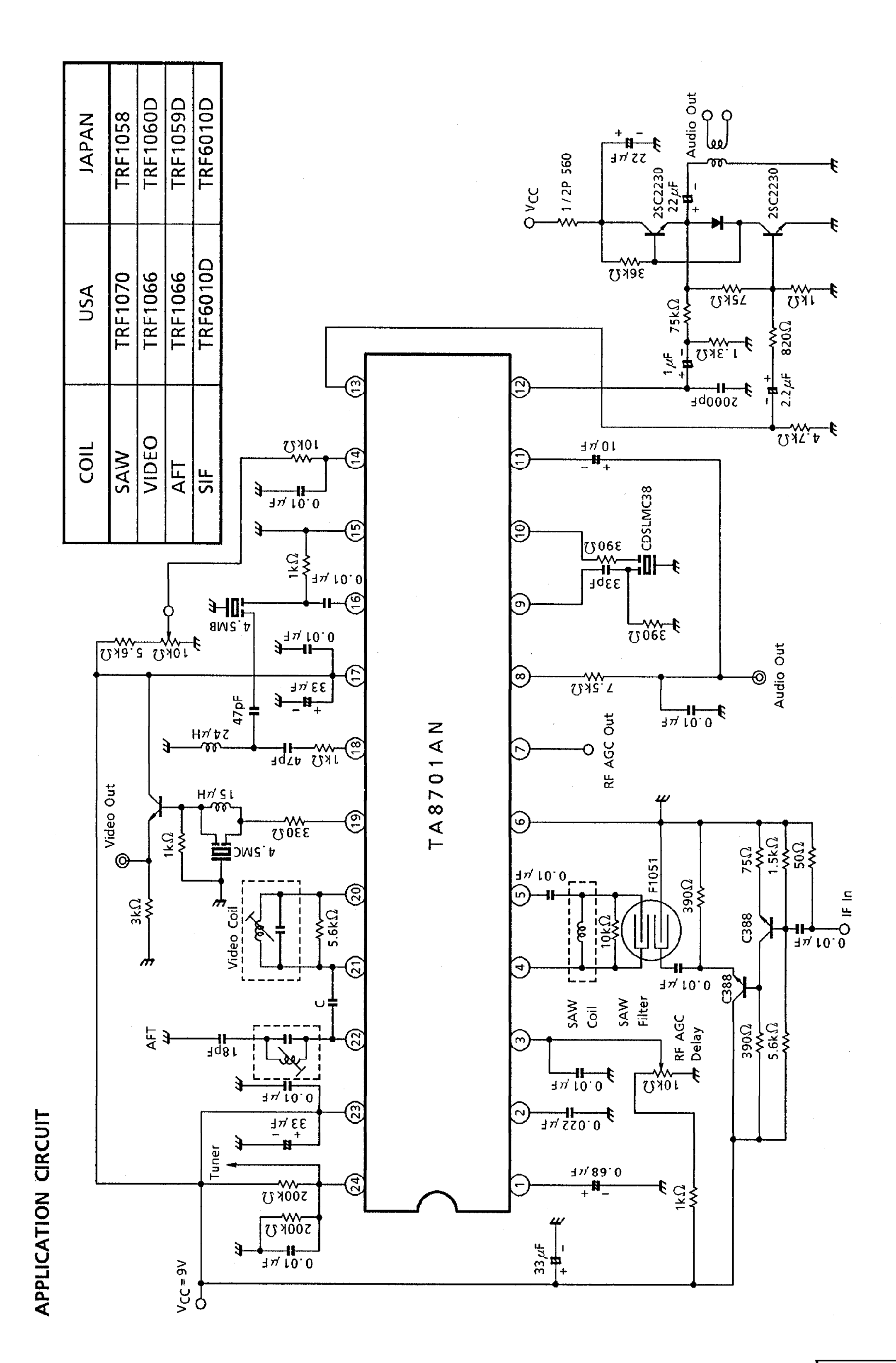

Ta = 25°C
V_{CC} = 9V
V_{IN} = 80dBμV
Delay Point = 4.5V
75°C
25°C
− 25°C
RF·AGC OUTPUT VOLTAGE (V)
RF INPUT LEVEL (dBμV)
0
2
4
6
8
10
12
20
70
74
78
82
86
90
94


SIF / AMR CHARACTERISTICS
SIF Output
(25kHz / devi, f_m = 400Hz)
AMR Characteristics
AMR (dB)
DETECTOR OUTPUT LEVEL (mV_{rms})
RF INPUT LEVEL (dBμV)
10
20
30
40
50
60
70
0
100
200
300
400
500
600
30
40
50
60
70
80
90
100


SIF BANDWIDTH CHARACTERISTICS
Detector Output Level
Output DC Voltage
Distortion Ratio
DISTORTION RATIO (%) TERMINAL VOLTAGE (V)
DETECTOR OUTPUT LEVEL (mV_{rms})
f_o (MHz)
0
2
4
6
8
10
12
0
100
200
300
400
500
600
4.3
4.4
4.5
4.6


ATT CONTROL CHARACTERISTICS
AUDIO OUTPUT (mV_{rms})
ATT CONTROL VOLTAGE (V)
0
200
400
600
800
1000
0
1
2
3
4
5
6
9

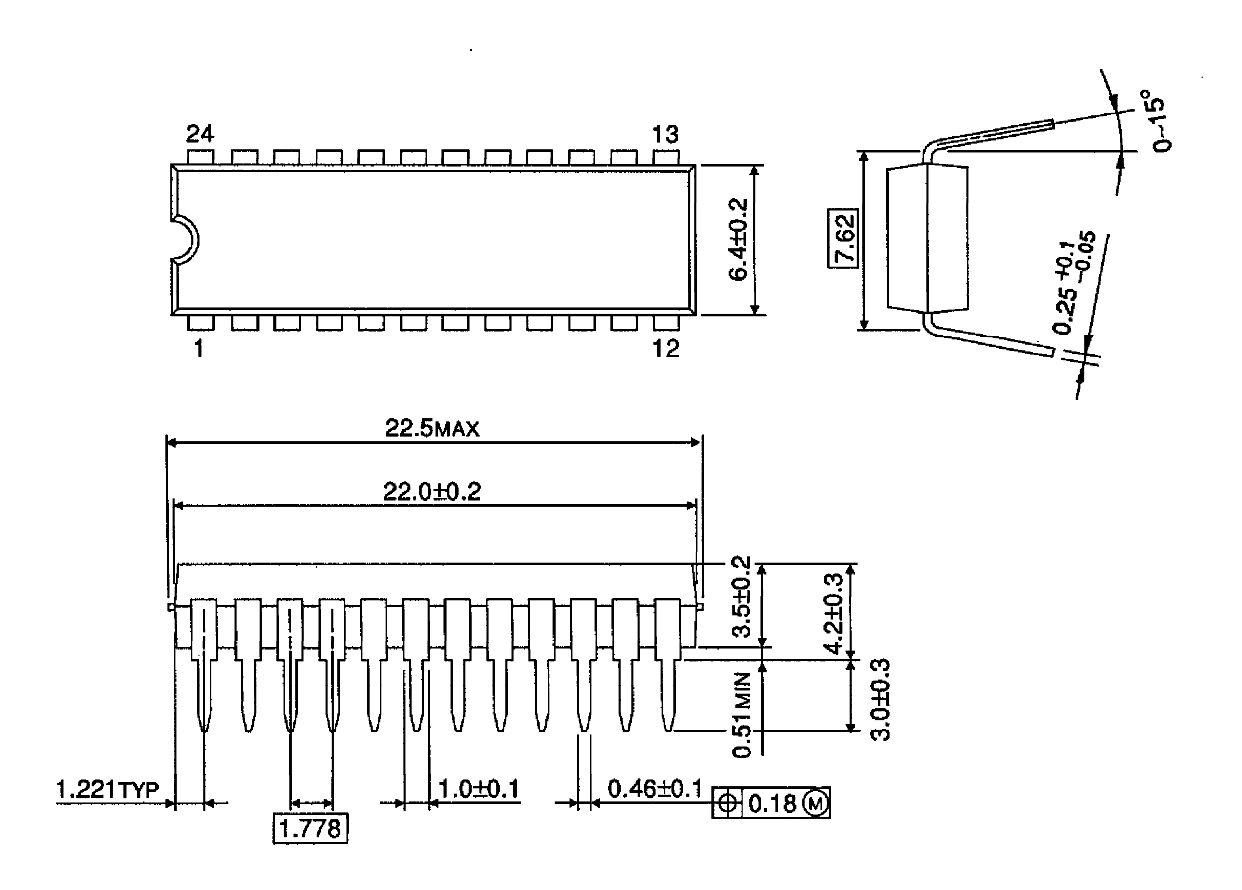
APPLICATION CIRCUIT



COIL	USA	JAPAN
SAW	TRF1070	TRF1058
VIDEO	TRF1066	TRF1060D
AFT	TRF1066	TRF1059D
SIF	TRF6010D	TRF6010D

OUTLINE DRAWING
SDIP24-P-300

Unit : mm



Weight : 1.22g (Typ.)